

## CLAIMS

1. A method for encapsulating liquid crystal materials in a polymeric spherical shell with a narrow size distribution, which comprises
  - preparing an aqueous emulsion with a narrow size distribution of an oily phase containing a polymer forming material and an initiator material, wherein the oily phase is homogenised in a hydrophilic phase in which the oily material is more soluble than in water, but sufficiently insoluble to form an emulsion by homogenisation,
  - stabilising the emulsion by diluting the aqueous phase by addition of a high portion of water, and
  - polymerising the polymer forming material to form polymer particles with a narrow size distribution, characterised in that
  - a liquid crystal material is dissolved into the oily phase during the preparation of the aqueous emulsion in a sufficient amount to form one or several separate phase(s) of the liquid crystal within the polymer forming material during polymerisation, such that the one or more liquid crystal phase(s) become(s) encapsulated inside the spherical polymeric particle being formed.
2. A method according to claim 1, characterised in that the polymer forming material is added to the oily phase after homogenisation, that is, the oily phase comprises only the liquid crystal material and the initiator material during emulsification.
3. A method according to claim 1, characterised in that the initiator material is added to the oily phase after homogenisation, that is, the oily phase comprises only the liquid crystal material and the polymer forming material during emulsification.
4. A method according to claim 1, characterised in that both the initiator material and polymer forming material are added to the oily phase after homogenisation, that is, the oily phase comprises only the liquid crystal material during emulsification.
5. A method according to claims 1-4, characterised in that the liquid crystal material may be in one of the following mesophases at ambient temperatures: nematic, cholesteric (chiral nematic), or smectic phases comprising smectic A or smectic C.
6. A method according to claim 5, characterised in that the polymer forming material is a monomer preferably

chosen from the group of vinyl monomers comprising acrylics, methacrylics and styrenics, such as MMA, BA, HEMA, GMA, St, and crosslinking monomers like EGDMA and DVB.

- 5 7. A method according to claims 1-6,  
characterised in that additional and auxiliary compounds such as dopants, dyes,  
and/or initiators is/are added into the oily phase during the preparation of the  
aqueous emulsion.
- 10 8. Use of spherical polymer particles containing encapsulated liquid crystal  
material in one or several phases when produced according to the inventive  
method as given by claims 1-7, in optical devices.
9. Use of spherical polymer particles containing encapsulated liquid crystal  
material of smectic A or smectic C phase when produced according to the  
inventive method as given by claims 1-7, in optical screen devices intended for  
outdoor use.